

AI-Supported Learning and Student Engagement: A Mixed-Methods Study Across Neurodivergent and Neurotypical Classrooms

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Abstract

This study builds on prior qualitative, multi-agency research examining the integration of artificial intelligence (AI) within formative feedback for neurodivergent learners, with particular attention to learner agency and evolving classroom dynamics. Analysis focuses on patterns of engagement across these broad themes and across the full learner groups, offering an initial, exploratory account of how AI-supported activities may shape engagement in diverse classrooms, while recognising the constraints of scale and reliance on self-reported measures. Framed by the research question 'to what extent does AI-supported learning influence engagement across neurodivergent and neurotypical students? The study is grounded in a triadic pedagogical model of AI–teacher–student interaction, drawing attention to the emerging role of emotionally attentive, 'kind feedback' practices replicated through AI systems (Caton & Bradford-Keegan, 2025). A mixed-methods comparative design was selected to best capture the complexities of students' engagement in AI mediated tasks. Quantitative data was derived from a student self-reporting survey informed by the five dimensions of engagement adapted from the Department for Education's Engagement Model (2024) was employed. Qualitative rich observations were collected from classroom observations conducted by teaching staff to capture key indicators, including curiosity, agency, conceptual understanding, predictive reasoning, sustained engagement, independence, and learner ownership.

Keywords: Classroom observation; Generative AI; Mixed methods; Neurodivergent agency; Student Engagement